

REMARKS

By the above actions, claims 1, 7, and 8 are amended and claim 10 canceled, the amendments to claim 1 incorporating features previously found in claims 7, 8 and 10. In view of these actions and the following remarks, further consideration of this application is requested.

Claims 1 to 6 have been rejected under 35 U.S.C. §102(a) as being anticipated by U.S. Patent No. 6,580,054 to Liu et al. (Liu). In Applicants' die bonding apparatus, the expanding stage 41 with which the wafer tape T is in contact is chamfered in circular arc form making the wafer tape readily expandable with the result that the gaps between the individual dies divided by laser machining are widened; see, page 7, lines 6-10 of the present application.

There is no explicit teaching in Liu of a die bonder having an expanding part including an expandable stage having chamfered edges that widens a gap between the individual dies after the laser light forms the modified region within the wafer, as recited in independent claim 1 as currently amended. In Liu, mechanical pressure is first applied to break the wafer along the scribe lines, then the wafer tape is stretched for separation and transport to other mounting apparatus using a pick and place system. Liu discloses only the method steps in column 9, line 57 to column 10, as relied on by the Examiner. Nowhere in Liu is there a disclosure of the structure "an expanding part," as recited in original claim 1, let alone one with an "expanding stage having a frame with a chamfered top edge portion which engages an expandable wafer tape on which the wafer is supported" as recited in currently amended claim 1.

Claims 2 to 6, which depend from claim 1, are allowable for at least the above reasons and for the additional features recited therein. There is clearly no disclosure to only conforming dies on the wafer divided into the individual dies by the laser machining part, as recited in claim 5 (original) resulting in high efficiency because laser light is caused to be incident upon only conforming dies. There is also no disclosure of providing a product type marking on a surface of the conforming die by the laser machining portion for die dividing, as recited in claim 6 (original). If only conforming dies are marked, it is possible to perform product type markings more efficiently.

Clearly, Liu does not anticipate claims 1 to 6 as now presented, so that this rejection should now be withdrawn.

Claims 1 to 6 also have been rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 4,046,985 to Gates. Gates describes a laser treated wafer mounted on tape stretched across a receiving frame in column 2, lines 6-14. While mounted on the tape the wafer may be fractured and placed in a suitable transfer machine. Again, there is no disclosure anywhere in Gates of "an expanding part," as recited in currently amended claim 1, let alone an expanding part including an expanding stage and certainly not an "expanding stage having a frame with a chamfered top edge portion which engages an expandable wafer tape on which the wafer is supported," also recited in claim 1 as currently amended. Further, there is clearly no disclosure of only conforming dies on the wafer being divided into the individual dies by the laser machining part, as recited in claim 5 or of providing a product type marking on a surface of the conforming die by the laser machining portion for die dividing, as recited in claim 6.

Thus, Gates does not anticipate claims 1 to 6 as now presented and this rejection should also be withdrawn.

Claims 7 to 15 have been rejected under 35 U.S.C. §103(a) as being unpatentable over either of the Liu and Gates (which have been commented on as applied to claims 1 to 6 above), when viewed further in light of the disclosure of U.S. Patent No. 5,415,331 to Lin.

However, Lin does nothing to overcome the deficiencies of the Liu and Gates references. Only Prior Art Figure 1 of Lin is relied on by the Examiner in order to show an expanding web. However, there is no laser machining part in Prior Art Figure 1. In fact, dies 20 are separated from wafer 10 by sawing cuts 22 at the edge of each die in Prior Art Figure 1 of the Lin patent. The Office Action states that it would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the transfer device disclosed by Lin in place of the transfer device disclosed by Liu and/or Gates, but no basis for that conclusion exists. For one thing, Lin discloses sawing cuts in Prior Art Figure 1, while Liu and Gates employ lasers. The mere existence of laser beam machining does not provide an adequate suggestion for making the proposed modification. In any event, there is no disclosure anywhere in Lin of "an expanding part that widens a gap between the individual

dies after the laser light forms the modified region within the wafer, said expanding part comprising an expanding stage having a frame with a chamfered top edge portion which engages an expandable wafer tape on which the wafer is supported."

None of the prior art shows or suggests a die bonder having the combination of a laser machining part and an expanding part including an expanding stage having a frame with a chamfered top edge portion that widens the gap between individual dies after the laser light forms a modified region within the wafer. Accordingly, the rejection under § 103 should be withdrawn.

In view of the foregoing, in the absence of new and more pertinent prior art being found, claims 1 to 9 and 11 to 15 should be indicated to be allowable over the prior art and this application approved for issuance as a patent.

While this application should now be in condition for allowance, in the event that any issues should remain after consideration of this response which could be addressed through discussions with the undersigned, then the Examiner is requested to contact the undersigned by telephone for that purpose.

Respectfully submitted,

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